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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/812,821	03/21/2001	Thomas Alexander	502P36US	1914
20779	7590	10/07/2004	EXAMINER	
SHAPIRO COHEN P.O. BOX 3440 STATION D OTTAWA, ON K1P6P1 CANADA			LEE, ANDREW CHUNG CHEUNG	
			ART UNIT	PAPER NUMBER
			2664	

DATE MAILED: 10/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 09/812,821	<b>Applicant(s)</b> ALEXANDER ET AL.	
	<b>Examiner</b> Andrew C Lee	<b>Art Unit</b> 2664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 March 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 - 36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,17-24,26-31,33,35 and 36 is/are rejected.
- 7) ☒ Claim(s) 5-16,25,32 and 34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>17-09-2001</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: page 22, line 3, the reference element "37". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, regarding Fig. 1, the time-division-multiplexed and/or time-division-demultiplexed function blocks must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure

number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities:

- Page 35, Claim 1, lines 12, the term " $j \cdot (\log_2 j + 1)$ " should be corrected as " $j \cdot (\log_2 j + 1)$ ).
- Page 44, Claim 27, line 22, the term "intereleaved" should be corrected as "interleaved"
- Page 22, line 3, the reference element "37" is mentioned, but not indicated in the Fig. 6.

Appropriate correction is required.

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: " an output delay network comprising a number of delay stages Q in each parallel stream carrying the output data stream wherein  $Q=(R-X)$ , where R represents the total number of parallel output lines carrying the output data stream and X represents a whole number counting from 1 representing a count of each successive line forming the output bus carrying the output data stream" as disclosed in Claims 3, 4, 13, 20, 28, respectively.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 – 4, 17 – 24, 26 – 31, 33, 35, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arora et al. (U.S. Patent No. 5521591) in view of Wong (U.S. Patent No. 6693456 B2).

Regarding Claims 1, 17, 18, 22, 23, 24, 26, 29, 30, 33, 35, 36, Arora et al. discloses the limitation of a multi-data-stream merge network comprising a pipelined

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butterfly network for receiving parallel streams of data which are in interleaved order and which are located at specific spatial boundaries ( Fig. 5, column 6, lines 3 – 7), and which includes means for concatenating data from the received streams of data into constant width interleaved words having width which is wider than any of the received streams of data (column 6, lines 7 – 10), and means for merging the constant width words onto an output bus in a time-division multiplexed form so as to produce a constant-width interleaved output data stream (column 6, lines 22 – 25), wherein the pipelined butterfly network is comprised of  $j \cdot \log_2 j$  successive stages of multiplexers and  $j \cdot (\log_2 j + 1)$  delay stages (column 6, lines 9 – 11), in which  $j$  represents the number of parallel lines of byte lanes of input streams of data (column 6, line 9), the multiplexers being interconnected in a butterfly pattern (column 2, lines 48 – 52), Arora et al. fails to disclose the limitation of apparatus for applying select signals to the multiplexers which select signals toggle after  $2^i$  clock signals for the  $i^{\text{th}}$  stage of multiplexers following a starting value for a sequence of select signals offset by  $k \bmod 2^{(i-1)}$  for each successive multiplexer in the  $i^{\text{th}}$  stage of multiplexers Wong discloses the limitation of apparatus for applying select signals to the multiplexers which select signals toggle after  $2^i$  clock signals for the  $i^{\text{th}}$  stage of multiplexers following a starting value for a sequence of select signals offset by  $k \bmod 2^{(i-1)}$  for each successive multiplexer in the  $i^{\text{th}}$  stage of multiplexers (Fig. 10, column 10, lines 10 – 14; lines 46 – 48). It would have been obvious to modify Arora et al. to include apparatus for applying select signals to the multiplexers which select signals toggle after  $2^i$  clock signals for the  $i^{\text{th}}$  stage of multiplexers following a starting value for a sequence of select signals offset by  $k$

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$\text{modulo } 2^{(i-1)}$  for each successive multiplexer in the  $i^{\text{th}}$  stage of multiplexers such as taught by Wong in order to provide flexibility of network interconnection and Fault tolerance.

Regarding Claims 2, 3, 4, 19, 20, 28, Arora et al. discloses the limitation of a network comprising an input delay network containing P serial delay stages in which each respective successive parallel input data stream is delayed by said P serial delay stages, where  $P=(M-1)$ , M being a whole number counting from 1 representing a count of each respective successive input data stream, said input delay network receiving the streams of data and passing each stream to an input of a corresponding multiplexer of a first stage of said multiplexers (column 12, lines 2- 8).

Regarding Claim 31, Arora et al. discloses the limitation of a network including a permutation network located upstream of the pipelined butterfly network (column 12, lines 1 – 6), for receiving streams of data and for rearranging the spatial order of the streams of data if desirable or necessary and locating each stream on a specific spatial boundary (column 12, lines 7 – 9), wherein the permutation network is configured to reorder positions of data streams so that byte lanes of respective streams which are a multiple of the narrowest of the data streams are respectively contiguous and are located on a specific spatial boundary (column 12, lines 14 – 19).

Regarding Claim 21, Arora et al. discloses the limitation of a pipelined butterfly network wherein the butterfly network is non-blocking ( column 14, lines 56 –57) and is comprised of a plurality of stages of multiplexers and delay elements mutually interconnected (column 6, LINES 4 – 7) and selected so as to provide to each parallel line containing said delay stages carrying the output data stream (column 6, lines 7 – 9), an ordered and sequential stream of bytes from each successive word of all the input data streams, the sequence of bytes on successive ones of the parallel lines having successive bytes of a data word each delayed by a delay interval of one delay stage.( column 6, lines.14 – 22).

Regarding Claim 27, Arora et al. discloses the limitation of a method of merging multiple input data streams into an output data stream having a word size that is equal to or larger than the sum of all of the input data streams (Fig. 3, column 5, lines 60 – 62), wherein the word size of the output data stream is a multiple of the smallest common factor of the word sizes of the input data streams (column 5, lines 62 – 64), comprising: a) delaying each successive input data stream by a delay clock unit equal to  $(M-1)$ ,  $M$  being a whole number representing a count of each successive input data stream counting from 1 (column 12, lines 7 - 9), (b) switching each successive byte of each delayed data stream to a corresponding successive internal output line and wherein each corresponding byte of all of the input data streams is in sequence on a corresponding internal data line (column 12, lines 14 – 19), and (c) delaying data streams on each of the internal data lines by respective delay clock units so as to cause



all of the sequential bytes of an input data word to appear at the same time in parallel on respective output lines of an output bus, and all of the corresponding bytes of all data words to appear respectively at the same time in parallel, in sequence, and interleaved, on the output bus (Fig. 10, column 16, lines 1 –19).

### ***Allowable Subject Matter***

7. Claims 5 – 16, 25, 32, 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew C Lee whose telephone number is (571) 272-3131. The examiner can normally be reached on Monday through Friday from 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin can be reached on (571) 272-3134. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ACL 30 Sep 2004

  
**AJR Patel**  
Primary Examiner

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